A METHOD FOR THE DEHYDRATION OF HISTOLOGICAL MATERIAL

A combination of the glycerine dehydration method with the paraffin imbedding method in preparing histological material has given such satisfactory results that, while there is nothing new in the method itself, its advantages seem to justify bringing it to the attention of botanists, since the combination of the two is not in general practice. For some time the writer has been using glycerine in dehydration instead of alcohol in the preparation of small objects such as the megaspores and microspores of *Marsilia* and *Selaginella*, and has recently attempted using it on larger objects such as leaf tissue, ovulate and staminate sporophylls of the conifers, and anatomical material generally. It has uniformly given good results and indicates possibilities of more general application.

The method is exactly the same as is given for the glycerine dehydration in the preparation of glycerine and Venetian turpentine mounts of algae and fungi. The material to be imbedded is first killed with some of the usual killing agents, such as Fleming's solution or chromo-acetic acid solution 1:1:100 diluted to one-third or one-fourth strength at a temperature of 50–60°C. After killing for 12–24 hours the usual washing with water should follow. When free from acid the material is placed in a shallow open container, as a watch glass or a Petri dish, and covered with a 10 per cent glycerine solution in sufficient quantity to more than cover the material. The dish is allowed to stand open, but protected from the dust and subjected to the ordinary evaporation of the laboratory air, insuring a steady rapid dehydration by the evaporating of the water from the glycerine solution which gradually becomes concentrated. Within two or three days the glycerine is fully concentrated and the material is at about the same stage of concentration it would have been had it been "run up" through grades of alcohol to about 95 per cent.

The glycerine should be rather carefully removed by washing the material in 95 per cent alcohol. Specific manipulation for this particular process may be devised for each kind of material. Large pieces of material may often be removed from the glycerine with forceps or needles, or frequently the glycerine may be poured off the material. In any event, it is important to remove all of the glycerine by repeated washings in 95 per cent alcohol, since the presence of the former seems to interfere in the further processes of imbedding. Absolute alcohol is used to complete the dehydration, and any of the standard methods of substituting a paraffin solvent for the alcohol may follow from this point.

The advantages of the method are as follows: (1) dehydration is accomplished uniformly, rapidly, and with a minimum of work and

attention on the part of the operator; (2) when imbedded by this method material seems to cut better, since glycerine seems to harden less than alcohol; (3) material may be stored in the concentrated glycerine if it be desirable to postpone the imbedding processes.—J. BEN HILL, *Pennsylvania State College, State College, Pa.*

BISPORANGIATE CONES OF LARIX

(WITH ONE FIGURE)

In the early spring of the present year (1915), in the vicinity of Missoula, Montana, abnormal cones were observed among normal ones on a single tree of *Larix occidentalis.* The abnormal cones were about the same size as the normal ovulate cones of the species, and consisted of two parts; the lower half of the cone presented the normal appearance of the staminate cone with the total absence of the scale, the upper half presented the typical condition of the macrostrobilus with bract and scale. The scales bore two ovules, to all external appearances normal. Between the lower and the upper portions of the cone were a few transitional structures representing abortive bracts and scales. Some of these structures are shown in the accompanying figure.

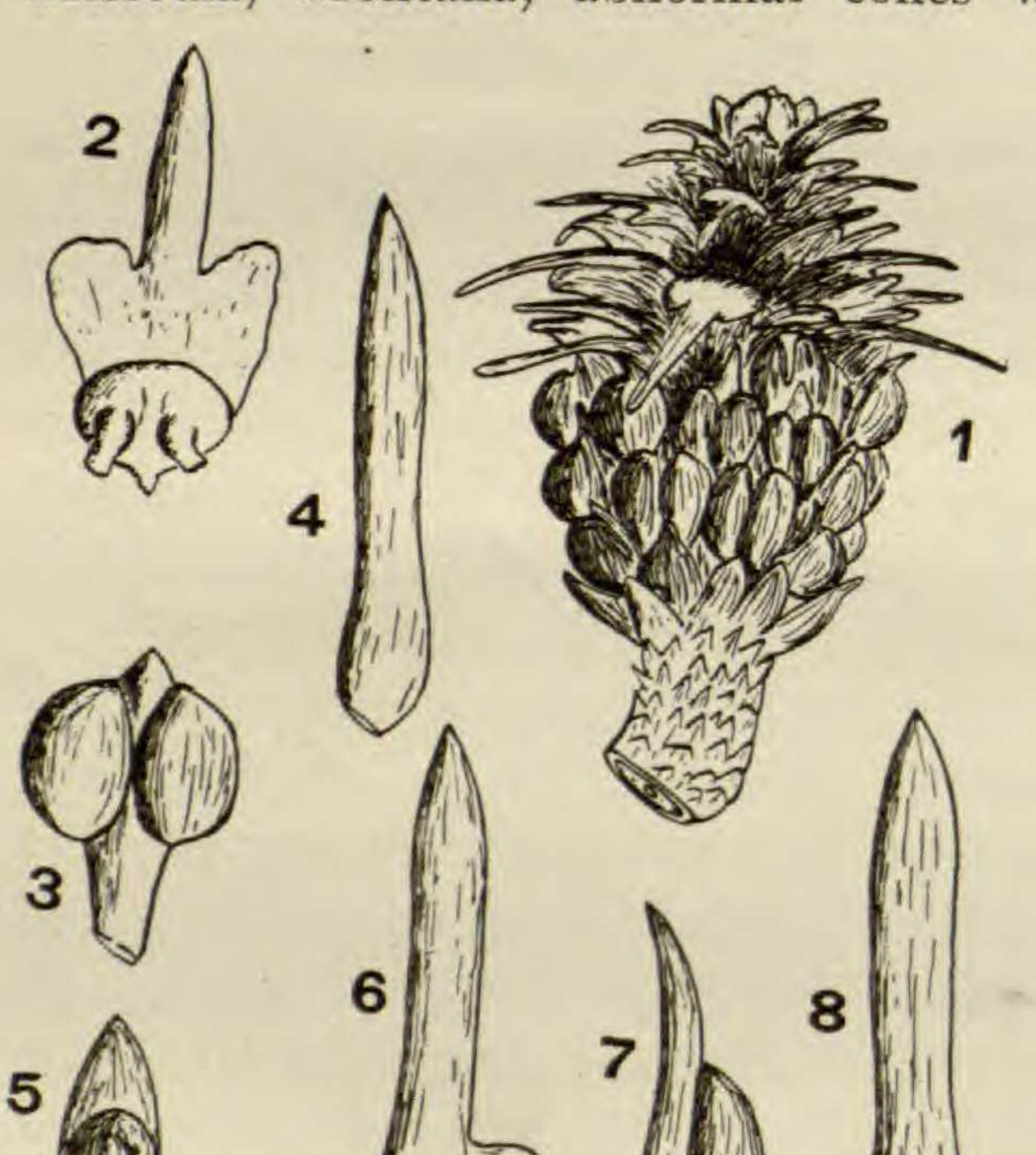

FIG. 1.—*Larix occidentalis:* 1, abnormal or bisporangiate cone, $\times 3\frac{1}{3}$; 2 and 3, normal sporophylls and bract from the cone at 1; 4–8, abnormal bracts; 2–8$\times 6\frac{2}{3}$.

The pollen produced in the bisporangiate cone, on those sporophylls where the sporangia were apparently perfect, in its microscopic structure appeared to be the same as the pollen formed in the normal staminate cone on the same branch, except that it was somewhat smaller, measur-